

PATENT SPECIFICATION

3568

768,226



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Specification: Date: Feb. 18, 1953.

No. 4597/53.

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Index at Acceptance:—Classes 69(2), F12; and 91, F2.

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COMPLETE SPECIFICATION

SPECIFICATION NO. 768,226

By a direction given under Section 17(1) of the Patents Act 1949 this application proceeded in the names of Farbwerke Hoechst Aktiengesellschaft Vormals Meister Lucius & Brüning, a body corporate recognised under German law, of Frankfurt (M) - Höchst, Germany, and Heinz Teves, of Humperdinkstr. 4, Frankfurt/Main, Germany, Ernst August Teves, of Georg Voigt-Str. 3, Frankfurt/Main, Germany, and Martin Tausend of Frauerlobstr. 17, Frankfurt/Main, Germany, all German citizens, trading as Alfred Teves Maschinen- und Armaturenfabrik Kommandit-Gesellschaft.

THE PATENT OFFICE,

25th July, 1957

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The present invention is based on the observation that the lubricating properties of hydraulic fluids comprising 85 per cent. by weight or more of liquid alkylene or polyalkylene glycols and/or ethers thereof and/or monohydric aliphatic alcohols can be enhanced or modified by incorporating as lubrication improving component 15 to 3 per cent by weight of a boric acid ester with mono- or poly-hydric alcohols or other hydroxy compounds, or their mixtures or a salt of boric acid with an amino base including ammonia or mixtures of these compounds. compounds.

Boric acid esters are especially suitable. The esterification components may be mono-, di- or polyhydric alcohols or any compounds, for example, amines, containing hydroxyl groups. As such components there may be mentioned, for example, ethylene glycol, 1:2-propylene glycol, 1:3-butyleneglycol, di- or tri-ethylene glycol, higher polyalkylene glycols, glycerine and penta-erythritol, the molecular ratio of boric acid to the alcohol being chosen as desired. Among the salts those with ethanalamines may be mentioned.

The aforesaid components need not be

especially its resistance to low temperatures, its behaviour towards rubber and metals, and its compatibility with other hydraulic fluids, remain substantially unchanged. The usual anti-corrosion agents can also be used with the boric acid compounds substantially without undergoing change. Also about 2 per cent. of castor oil and about 2 per cent. of water can be added to the hydraulic fluid.

In the following examples are given the compositions of a few hydraulic fluids in accordance with the invention, the parts being by weight:

EXAMPLE 1.

55 parts of triethylene glycol.	
10 " " polyethylene glycol monoethyl ether.	80
10 " " polyethylene glycol monomethyl ether.	
10 " " polyethylene glycol monobutyl ether.	85
15 " " an ester consisting of the reaction product from 7.5 parts by weight of ethylene glycol and 7.5 parts by weight of boric acid.	90

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COMPLETE SPECIFICATION

Improvements in Hydraulic Fluids.

We, FARBWERKE HOECHST AKTENGESSELLSCHAFT VORMALS MEISTER LUCIUS AND BRUNING, a body corporate recognised under German law, of Frankfurt (M)—Höchst,

Germany, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

It is known to use hydraulic fluids consisting essentially of alkylene glycols or polyalkylene glycols or ethers thereof and/or monohydric aliphatic alcohols, for hydraulically operated brakes in motor vehicles, hydraulic installations and the like. These fluids are known to have the disadvantage of poor lubricating qualities, which impairs their general usefulness.

The present invention is based on the observation that the lubricating properties of hydraulic fluids comprising 85 per cent. by weight or more of liquid alkylene or polyalkylene glycols and/or ethers thereof and/or monohydric aliphatic alcohols can be enhanced or modified by incorporating as lubrication improving component 15 to 3 per cent by weight of a boric acid ester with mono- or poly-hydric alcohols or other hydroxy compounds, or their mixtures or a salt of boric acid with an amino base including ammonia or mixtures of these compounds.

Boric acid esters are especially suitable. The esterification components may be mono-, di- or polyhydric alcohols or any compounds, for example, amines, containing hydroxyl groups. As such components there may be mentioned, for example, ethylene glycol, 1:2-propylene glycol, 1:3-butylene glycol, di- or tri-ethylene glycol, higher polyalkylene glycols, glycerine and penta-erythritol, the molecular ratio of boric acid to the alcohol being chosen as desired. Among the salts those with ethanolamines may be mentioned.

The aforesaid components need not be

bound singly to boric acid. It is often of advantage to use a mixture of different esterifying components of the kind mentioned above, for example, different alcohols, for the esterification. Furthermore, mixtures of 50 polyvalent and monovalent alcohols may be used. In the polyalkylene glycols the oxygen of the ether bridges may be wholly or in part replaced by sulphur. Thus, for example, thiodiglycol may be used instead of diethylene glycol.

An addition of 3-15% by weight of the above mentioned boric acid compound suffices to produce a substantial increase in the lubricating property of the hydraulic fluid. The addition of such a compound does lead to a certain increase in viscosity, but the other properties of the hydraulic fluid, especially its resistance to low temperatures, its behaviour towards rubber and metals, and its compatibility with other hydraulic fluids, remain substantially unchanged. The usual anti-corrosion agents can also be used with the boric acid compounds substantially without undergoing change. Also about 2 per cent. of castor oil and about 2 per cent. of water can be added to the hydraulic fluid.

In the following examples are given the compositions of a few hydraulic fluids in accordance with the invention, the parts being by weight:

EXAMPLE 1.

55 parts of triethylene glycol.	
10 " " polyethylene glycol monoethyl ether.	80
10 " " polyethylene glycol monomethyl ether.	
10 " " polyethylene glycol monobutyl ether.	85
15 " " an ester consisting of the reaction product from 7.5 parts by weight of ethylene glycol and 7.5 parts by weight of boric acid.	90

EXAMPLE 2.

- 18 parts of diethylene glycol.
 20 " " triethylene glycol.
 50 " " polyethylene glycol
 5 " " monobutyl ether.
 5 " " ethyleneglycol monoethyl
 ether.
 2 " " castor oil.
 5 " " triethanolamine borate.

EXAMPLE 3.

- 10 parts of ethylene glycol.
 30 " " triethylene glycol
 10 " " diacetone alcohol
 20 " " polyethylene glycol
 20 " " monomethyl ether.
 10 " " polyethylene glycol
 monoethyl ether.
 10 " " boric acid glycerine ester,
 consisting of the reaction
 product from 116 parts by
 weight of glycerine (86%)
 and 134 parts by weight of
 boric acid.

EXAMPLE 4.

- 60 parts of triethylene glycol
 20 " " dipropylene glycol.
 monoethyl ether.
 10 " " ethyl alcohol.
 2 " " water
 8 " " a boric acid ester prepared
 from:
 3.4 parts by weight of 1:3-butylene
 glycol.
 2.4 parts by weight of boric acid.
 2.3 parts by weight of triethanolamine.

EXAMPLE 5.

- 50 parts of triethylene glycol.
 30 " " ethylene glycol
 monocethyl ether.
 40 10 " " polypropylene glycol
 monobutyl ether.
 10 " " an esterification product
 from:
 4.5 parts by weight of thiodiglycol, and
 45 5.5 parts by weight of boric acid.

What we claim is:

1. Hydraulic fluids comprising 85 per cent. by weight or more of liquid alkylene or polyalkylene glycols and/or ethers thereof and/50 or monohydric aliphatic alcohols and as lubrication improving component 15 to 3 per cent. by weight of a boric acid ester with mono- or poly-hydric alcohols or other hydroxy compounds or their mixtures or a salt of boric55 acid with an amino base including ammonia or mixtures of these compounds.

2. Hydraulic fluids as claimed in Claim 1, wherein the compound of boric acid is an ester of boric acid with a glycol or polyglycol.

3. Hydraulic fluids as claimed in claim 1, wherein the compound of boric acid is an ester of boric acid with a polyglycol of which65 the oxygen of the ether bridge or bridges is wholly or in part replaced by sulphur.

4. Hydraulic fluids as claimed in Claim 1, wherein the compound of boric acid is a salt70 of boric acid with an ethanolamine.

5. Hydraulic fluids as claimed in any one of Claims 1 to 4 containing about 2 per cent.75 of castor oil.

6. Hydraulic fluids as claimed in any one of Claims 1 - 5 containing about 2 per cent.80 of water.

7. A hydraulic liquid having substantially the composition given in any one of the Examples herein.

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